4, lines 50-53. Claims 1 and 9 recite a method for forming a capacitor that includes the step of oxidizing an upper surface of the non-oxide electrode. In addition, Summerfelt et al. does not teach depositing a high dielectric material on an oxidized surface of a non-oxide electrode as recited in claims 1, 4, and 9. Rather, Summerfelt et al. teaches depositing a La-doped $BaSrTiO_3$ on a TiN electrode buffer, but this TiN electrode buffer layer 42 provides an electrical connection to the doped silicon region 40 and is not oxidized. See col. 4, lines 46-53. Thus, every limitation of claims 1 and 9 is not taught by Summerfelt et al. Therefore, claims 1 and 9 are novel over Summerfelt et al. Claim 4 depends from claim 1; therefore, claim 4 is also novel over Summerfelt et al. Nor does Summerfelt et al. suggest the method claimed in claims 1, 4, and 9.

Claims 2, 3, 5-8, 10-29, and 38 have been rejected under 35 USC §103(a) as being unpatentable over Summerfelt et al. The Examiner asserts that Summerfelt et al. teaches a method for forming a capacitor, comprising: providing a non-oxide electrode (42), such as TiN; depositing a high dielectric-constant oxide dielectric material (34, 36) on the oxidized surface of the non-oxide electrode; and depositing an upper electrode (38). There is nothing in Summerfelt et al. that would suggest or motivate one of ordinary skill in the art to oxidize the upper surface of the non-oxide electrode and then deposit a high dielectric constant oxide dielectric material on the oxidized surface of the non-oxide electrode because Summerfelt et al. teaches a completely different capacitor that is formed in a completely different manner. The capacitor taught in Summerfelt et al., as explained above, has a TiN upper electrode 38 that overlays an undoped BST layer 36, which in turn overlays a lightly La donor doped BST lower electrode 34. The lightly La donor doped BST 34 is formed on a TiN electrode buffer layer 42, rather than on the insulating layer 32. The TiN electrode buffer layer 42 is used as a sticking layer and diffusion barrier for silicon, oxygen and impurities in the high-dielectric-constant BST layer 36.

The only mention of oxidation of the TiN layer explains that the TiN electrode buffer layer 42 provides electrical connection to the doped silicon region 40 below it. The reference further teaches that TiN works relatively well because the TiN electrode

buffer layer 42 must undergo substantial oxidation before it forms an insulating titanium oxide because TiON and TiO are conductive, but TiO_2 is insulating. Thus, Summerfelt et al. actually teaches away from the claimed invention because Summerfelt et al. does not want the TiN electrode buffer layer 42 to be oxidized. Summerfelt et al. does not suggest or motivate one of ordinary skill in the art to create a capacitor using a non-oxide electrode where the upper surface of the non-oxide electrode is oxided. In addition, there is no teaching or suggestion anywhere to deposit a high dielectric constant oxide dielectric material on the oxidized surface of the non-oxide electrode. There is no teaching or suggestion anywhere in Summerfelt et al. to create the claimed invention.

The Examiner admits that Summerfelt et al. does not teach: 1) providing a field effect transistor having a pair of source/drain regions, wherein one of the source/drain regions is connected to the capacitor electrode and the other source/drain region is connected to a bit line; 2) a method wherein the high-dielectric oxide is Al_2O_3, Ta_2O_5 or $Ba_xSr_{(1-x)}TiO_3$; 3) a method, wherein the oxidation is carried out in a temperature ranger of 250° to about 700° C, or 250° to about 500° C; 4) a method, wherein the oxidation is carried out in an O_2, O_3, H_2O or N_2O gas; and 5) a method, wherein the oxidation of the upper surface is performed in an oxide dielectric deposition chamber prior to deposition of the high-dielectric constant oxide material. After stating the above admissions, the Examiner then asserts that the subject matter of each of the above admissions would have been obvious to one of ordinary skill in the art. The Examiner offers no evidence that the claimed subject matter would have been obvious to one of ordinary skill in the art. To establish a prima facie case of obviousness, the burden is on the Examiner to establish sufficient evidence. Speculation and unsupported assertions and conclusions do not meet that burden.

Even if the Examiner offered evidence that the above recited features of the dependent claims would have been obvious to one of ordinary skill in the art, those claims would still be nonobvious over Summerfelt et al. The recited features are either included in a claim that depends from an independent claim or are included within an independent claim that recites the steps of oxidizing an upper surface of the non-oxide

electrode and depositing a high dielectric constant oxide dielectric material on the oxidized surface of the non-oxide electrode. As shown above, these steps are novel and nonobvious over Summerfelt et al. and therefore patentable. Thus claims 2, 3, 5-8,10-29, and 38 are nonobvious and patentable over Summerfelt et al.

New claims 39-41 have been added. Basis for the new claims is found in the specification at page 5, line 18 through page 6, line 7. No new matter has been added. New claims 39-41 are not taught or suggested by Summerfelt et al. as the claims recite oxidizing the upper surface of the non-oxide electrode and depositing a high dielectric constant oxide dielectric material on the surface of the non-oxide electrode. As shown above, Summerfelt et al. does not teach or suggest these steps. Therefore, new claims 39-41 are patentable over Summerfelt et al.

CONCLUSION

Applicants respectfully submit that, in view of the above remarks, the application is now in condition for allowance. Early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,

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